OCCUPATIONAL INJURIES AND DISEASES IN ALBERTA

Exploration
1995 to 1999

Upstream Oil and Gas
Sub-Sector #1

Alberta
HUMAN RESOURCES
AND EMPLOYMENT

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1. Introduction

The Mission of Alberta Human Resources and Employment

One of the missions of Alberta Human Resources and Employment is to work in partnership with Albertans to promote safe and healthy workplace, a quality working life and comprehensive safety systems. To this end, Alberta Human Resources and Employment recognises that monitoring health and safety in Alberta will help to ensure primary workplace health and safety concerns are actively managed and prioritised, and resources directed where most needed.

This report summarises the lost-time injuries and disease descriptions, characteristics of the injured worker and the risk of injury to workers in Alberta's upstream oil and gas industries for the years 1995 to 1999. Cost of the injuries and revenue in terms of total premiums paid by employers. Finally, a summary of occupational fatalities accepted by the WCB for compensation and brief descriptions of fatalities investigated by Occupation Health and Safety are also provided.

The purpose of this report is to provide government, employers, workers and health and safety officers in upstream oil and gas industries with information about the industry key health and safety issues.

Description of Upstream Oil and Gas Industries

The upstream oil and gas industries can be subdivided into the following sub-sectors.
Exploration, Oilfield Maintenance and Construction, Well Servicing with Service Rigs and Power Swivels, Drilling of Oil and Gas Wells, Oilfield Downhole and Other Services, Tar Sands, Petroleum Producers, and Oilfield Trucking Services.

The next section gives the descriptions of the Exploration sub-sector.

2. Sub-Sector Description

Sub-Sector # 1: Exploration

1. ***Seismic Geophysical/Mineral Exploration (Industry # 09200)***

This industry involves conducting exploration using seismic technology for the purpose of locating formations beneath the earth=s surface that may produce usable minerals such as coal, or oil and gas.

The basic procedure used to locate favorable formation beneath the earth=s surface is to send shock waves into the ground, and record the patterns on seismic recording equipment.

When exploring for oil and gas, any one of the following three methods may be employed to create the shock waves:

1. Seismographic - Dynamite exploded in a shot hole;
2. Vibraseismic - tractor or truck mounted vibrators which are released to the ground at certain points; and
3. Vacuum Guns - truck mounted piston strikes base plate to send shock waves through the ground

When exploring for minerals, such as coal, shock waves are created by means of small hand tools. Larger equipment is not required as minerals formations are generally not located as deep below the surface as are oil and gas.

Sound waves are received through instrument referred to as geophones. The geophones are in turn wired to recording instruments that log the sound wave patterns. The data processing and analysis of the obtained information, may or may not, be part of the contract.

This industry does not cover shot hole drilling. This is normally subcontracted out to another company classified in industry 09201. Should an employer conduct drilling in conjunction with exploration, an additional industry is required.

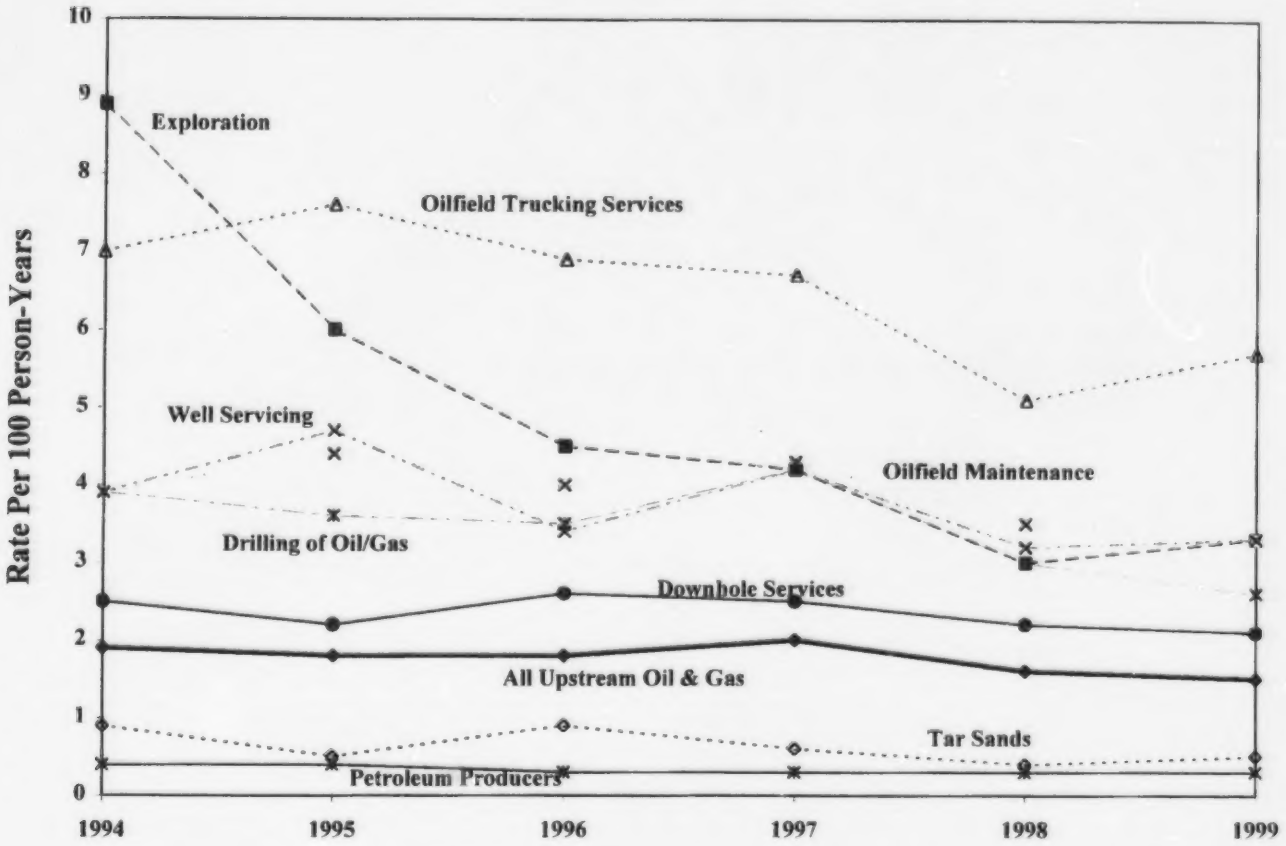
Geophysical Exploration, other than seismic, is classified in industry 86405. The key difference is the generation and recording shock waves.

2. Shot Hole Drilling (Industry # 09201)

The purpose of this industry is to drill bore holes for the purpose of holding explosives used in seismic exploration activities.

Shot hole drilling is performed with a small truck-mounted driller. This is normally a shallow drilling operation, drilling to a depth of 50 to 75 feet. This activity involves drilling only, as an exploration crew is responsible for placing and discharging the explosives. When the explosives are discharged or shot, the vibrations are recorded on a seismograph.

Lost-Time Claim Rates
Upstream Oil & Gas Subsectors
Alberta: 1994-1999



3. Lost-Time Claim Rates and Duration Rates

Exploration

Year	# of Accounts	Cost	Person Years	Days Lost	Duration Rate	LTCs	LTC Rate
1995	217	$1,298,580	2,531	7,349	290	151	6.0
1996	222	$808,650	2,605	5,097	196	117	4.5
1997	221	$640,472	2,880	5,898	205	122	4.2
1998	228	$532,225	2,711	3,967	146	80	3.0
1999	230	$256,120	2,224	4,784	215	74	3.3

3.1 Lost-Time Claims by Industry

9200-Seismic Geophysical/Mineral Exploration

Year	# of Accounts	Cost	Person Years	Days Lost	Duration Rate	LTCs	LTC Rate
1995	71	$1,079,552	2,023	4,841	239	120	5.9
1996	70	$285,968	2,079	2,766	133	72	3.5
1997	64	$471,345	2,215	4,239	191	90	4.1
1998	69	$186,034	2,177	2,249	103	49	2.3
1999	67	$148,437	1,733	3,042	176	40	2.3

9201-Shot Hole Drilling

Year	# of Accounts	Cost	Person Years	Days Lost	Duration Rate	LTCs	LTC Rate
1995	146	$219,028	507	2,508	494	31	6.1
1996	152	$522,683	526	2,331	443	45	8.6
1997	157	$169,127	665	1,659	249	32	4.8
1998	159	$346,190	534	1,718	322	31	5.8
1999	163	$107,682	491	1,742	354	34	6.9

3.2 LTC Rates by Size of Employer: 1999

Size of Employer	# of Accounts	LTCs	Person - Years	LTC Rate
A: 0< PY <=1	106	7	51	13.7
B: 1 < PYs < 5	67	7	152	4.6
C: 5 <= PYs < 10	13	5	84	5.9
D: 10 <= PYs < 20	9	11	131	8.4
E: 20 <= PYs < 40	8	13	250	5.2
F: 40 <= PYs < 100	7	21	431	4.9
G: PYs >=100	6	10	1,125	0.9
H: Invalid	14	N/A	0	N/A
Total	230	74	2,224	3.3

4. Analysis of the Lost-Time Claims

4.1 Nature of Injury

LOST-TIME CLAIMS ALBERTA: 1995 TO 1999	OCCURRENCE YEAR					Total	
	1995	1996	1997	1998	1999	Number	Percent
SPRAIN, STRAIN, TEARS	77	45	51	40	34	247	45.4
FRACTURE, DISLOCATION	23	15	19	12	12	81	14.9
OTHER TRAUMATIC INJURIES/DISEASE	11	17	16	9	11	64	11.8
SURFACE WOUNDS, BRUISES	13	14	11	6	10	54	9.9
SYSTEMIC DISEASES,DISORDERS	11	9	7	6	1	34	6.3
OPEN WOUNDS	3	6	8	3	3	23	4.2
MULTIPLE DISEASE, DISORDERS	.	1	2	.	.	3	0.6
SYMPTOMS, SIGN/ILL-DEFINED CONDITIONS	.	1	.	1	.	2	0.4
BURNS	.	1	.	.	.	1	0.2
OTHER DISEASE,CONDITIONS,DISORDERS	1	.	.	.	.	1	0.2
NATURE-UNKNOWN	12	8	8	3	3	34	6.3
Total	151	117	122	80	74	544	100.0

4.2 Type of Event/Exposure

LOST-TIME CLAIMS ALBERTA: 1995 TO 1999	OCCURRENCE YEAR					Total	
	1995	1996	1997	1998	1999	Number	Percent
OVEREXERTION	28	12	23	18	13	94	17.3
TRANSPORTATION ACCIDENTS	26	22	23	11	6	88	16.2
BODILY REACTION	33	20	10	6	11	80	14.7
FALL ON SAME LEVEL	14	10	11	7	15	57	10.5
STRUCK BY OBJECTS	8	9	7	9	9	42	7.7
FALL TO LOWER LEVEL	10	6	10	3	3	32	5.9
CAUGHT IN OBJECTS	7	5	5	7	3	27	5.0
STRUCK AGAINST OBJECTS	4	3	4	2	2	15	2.8
EXPOSURE TO HARMFUL SUBSTANCE	1	6	6	1	.	14	2.6
OTHER FALLS	.	5	1	2	1	9	1.7
REPETITIVE MOTIONS	.	1	1	3	1	6	1.1
RUBBED OR ABRADED	2	.	.	1	2	5	0.9
ASSAULTS/VIOLENT ACTS BY PERSONS	.	1	1	1	.	3	0.6
OTHER BODILY REACTION/EXERTION	.	1	1	.	1	3	0.6
UNKNOWN	18	16	19	9	7	69	12.7
Total	151	117	122	80	74	544	100.0

4.3 Part of Body Injured

LOST-TIME CLAIMS ALBERTA: 1995 TO 1999	OCCURRENCE YEAR					Total	
	1995	1996	1997	1998	1999	Number	Percent
BACK	36	21	26	19	15	117	21.5
ANKLE(S) & FOOT(FEET)-NOT TOES	27	23	16	13	21	100	18.4
OTHER TRUNK	17	15	23	11	13	79	14.5
LEG(S)	22	15	14	7	6	64	11.8
WRIST(S)/HAND(S)	10	6	6	6	6	34	6.3
OTHER UPPER EXTREMITIES	12	6	5	4	3	30	5.5
FINGER(S)	5	4	9	5	1	24	4.4
NECK	9	6	3	3	1	22	4.0
OTHER HEAD	2	5	6	4	4	21	3.9
MULTIPLE BODY PARTS	5	5	6	3	.	19	3.5
EYE(S)	4	5	4	3	2	18	3.3
OTHER LOWER EXTREMITIES	.	3	1	1	2	7	1.3
BODY SYSTEMS	1	.	2	.	.	3	0.6
UNKNOWN	1	3	1	1	.	6	1.1
Total	151	117	122	80	74	544	100.0

4.4 Source of Injury

LOST-TIME CLAIMS ALBERTA: 1995 TO 1999	OCCURRENCE YEAR					Total	
	1995	1996	1997	1998	1999	Number	Percent
VEHICLES	30	26	26	16	7	105	19.3
PERSONS-INJURED WORKER	33	20	11	7	13	84	15.4
STRUCTURES/SURFACES	22	14	17	8	12	73	13.4
PARTS AND MATERIALS	9	12	12	7	9	49	9.0
OTHER PLANTS/ANIMALS/MINERALS	7	2	7	5	7	28	5.1
CONTAINERS	8	3	5	6	2	24	4.4
OTHER SOURCES	7	6	3	2	1	19	3.5
MACHINERY	.	2	4	5	3	14	2.6
HANDTOOLS-UNPOWERED	2	2	1	3	1	9	1.7
MINERALS-METALSL/NONMETALLIC	1	2	1	.	1	5	0.9
CHEMICAL/CHEMICAL PRODUCTS	.	1	4	.	.	5	0.9
OTHER TOOLS/EQUIPMENTS	.	.	1	2	1	4	0.7
FURNITURE AND FIXTURES	2	1	.	.	.	3	0.6
HANDTOOLS-POWERED	2	.	.	1	.	3	0.6
PERSONS-OTHER THAN INJURED WORKER	.	1	.	1	.	2	0.4
UNKNOWN	28	25	30	17	17	117	21.5
Total	151	117	122	80	74	544	100.0

4.5 Duration of Disability

LOST-TIME CLAIMS ALBERTA: 1995 TO 1999	OCCURRENCE YEAR					Total	
	1995	1996	1997	1998	1999	Number	Percent
A: 01 Day	6	3	12	2	3	26	4.8
B: 02 Days	6	4	8	2	1	21	3.9
C: 03 - 05 Days	20	7	14	5	5	51	9.4
D: 06 - 10 Days	26	18	17	13	9	83	15.3
E: 11 - 20 Days	14	13	16	9	4	56	10.3
F: 21 - 30 Days	10	18	13	11	7	59	10.8
G: 31 Days OR More	64	47	39	34	38	222	40.8
H: Unspecified	5	7	3	4	7	26	4.8
Total	151	117	122	80	74	544	100.0

5.2 Age of injured Worker

LOST-TIME CLAIMS ALBERTA: 1995 TO 1999	OCCURRENCE YEAR					Total	
	1995	1996	1997	1998	1999	Number	Percent
A: 15 - 19 Years	21	11	17	6	2	57	10.5
B: 20 - 24 Years	53	31	35	29	30	178	32.7
C: 25 - 34 Years	51	47	48	26	31	203	37.3
D: 35 - 44 Years	19	22	19	12	10	82	15.1
E: 45 - 54 Years	3	5	2	4	.	14	2.6
F: 55+ Years	3	1	1	3	1	9	1.7
G: Unspecified	1	.	.	.	.	1	0.2
Total	151	117	122	80	74	544	100.0

5.3 Length of Time Employed

LOST-TIME CLAIMS ALBERTA: 1995 TO 1999	OCCURRENCE YEAR					Total	
	1995	1996	1997	1998	1999	Number	Percent
A: LESS THAN 1 MONTH	54	33	39	27	25	178	32.7
B: 1 MONTH TO < 6 MONTHS	47	27	31	25	10	140	25.7
C: 6 MONTHS TO < 1 YEAR	12	5	5	6	4	32	5.9
D: 1 YEAR OR MORE	20	14	16	7	10	67	12.3
E: TIME UNSPECIFIED	18	38	31	15	25	127	23.3
Total	151	117	122	80	74	544	100.0

5.4 Gender of Injured Worker

LOST-TIME CLAIMS ALBERTA: 1995 TO 1999	OCCURRENCE YEAR					Total	
	1995	1996	1997	1998	1999	Number	Percent
MALES	145	114	119	78	73	529	97.2
FEMALES	4	.	2	2	.	8	1.5
UNSPECIFIED	2	3	1	.	1	7	1.3
Total	151	117	122	80	74	544	100.0

6. Cost of Claims and Employer Premiums

Sub-Sector 1-Exploration

	OCCURRENCE YEAR				
	1995	1996	1997	1998	1999
TRANSACTION YEAR					
1995	$1,246,757				
1996	$306,292	$726,172			
1997	$126,490	$199,689	$615,065		
1998	$97,694	$229,488	$181,101	$490,316	
1999	$31,768	$29,525	$117,885	$198,374	$315,243
Total Cost	$1,809,001	$1,184,874	$914,050	$688,690	$315,243
Total Premiums	$3,902,709	$2,805,168	$3,728,518	$2,267,966	$1,461,927

The above claim cost and employer premiums are for the five-year period 1995 through 1999. The data is as at July 5, 2000.

The cost of claim amount reflects only paid cost on claims that have occurred in the five-year period. The claim costs are tracked by occurrence year and the year that the costs were transacted.

The premiums are the total of all premiums paid by employers in each year.

7. Occupational Fatalities

An occupational fatality is the death of a worker that results from a work-related incident or exposure. Alberta Human Resources and Employment classifies occupational fatalities into three general types: motor vehicle incident, workplace incident and occupational diseases. Each is described in detail below.

Motor Vehicle Incident

Motor vehicle incidents typically involve highway vehicles operating on public roads in which the fatally injured worker was either the driver or a passenger. This category also includes fatalities involving aircraft crashes, train crashes, helicopter crashes, etc.

Workplace Incident

Fatal workplace incidents consist of cases in which the worker dies at a work site, or as a result of injuries sustained at a work site. It is this type of fatality that Alberta Human Resources and Employment may be responsible for investigating.

Occupational Diseases

Occupational disease fatalities consist mostly of recognized occupational disease, that is, disease known to be primarily or exclusively work-related (e.g. asbestosis, black lung disease). Occupational diseases are frequently diagnosed many years after the initial or crucial exposure to the toxic substance, and in such cases it is very difficult to determine when the fatal exposure occurred. Thus, the occupational disease category should not be interpreted to reflect present work site hazardous conditions or exposures.

Each year the Workers' Compensation Board (WCB) accepts some occupational fatality claims for compensation. Occupational fatality claims that were accepted in a particular year may include fatalities from prior years.

Description of Exploration Workplace Fatalities Accepted by the WCB Alberta: 1995-1999

Year	Occupational Disease		Motor Vehicle incident		Workplace Incident		Total	
	N	%	N	%	N	%	N	%
1995	0	0.0	5	100.0	0	0.0	5	100
1996	0	0.0	2	100.0	0	0.0	2	100
1997	0	0.0	1	100.0	0	0.0	1	100
1998	0	0.0	1	100.0	0	0.0	1	100
1999	0	0	0	0	0	0	0	0
Total	0	0.0	9	100.0	0	0.0	9	100

8. OHS Investigated Occupational Fatalities 1995-1999

There were no workplace fatalities investigated by Occupation Health and Safety(OHS) for the period 1995-1999

Appendix A: Terms, Definitions, and Formulas

Lost-Time Claim

A lost-time claim (LTC) is a claim for an occupational injury or disease which disables the worker beyond the day of injury. Included are claims for which wages compensation are paid, permanent disability claims, fatalities, and cases in which the injured worker is assigned light duties or other modified work.

Person-Years

Person-year estimates are calculated from wage and payroll data provided by account holders to the WCB. Alberta Labour uses these data to estimate. An average industry wage, and uses the average industry wage and employer payroll data to estimate person-years foe each employer and each industry. One person-year ie equivalent to one full-time worker working for one year, and can be assumed to equal 2,000 hours worked.

LTC Rate

The lost-time claim (LTC) rate is calculated by dividing the number of lost-time claims by the person-year estimate, and multiplying the result by 100. The LTC rate represent the probability or risk of disabling injury or disease to a worker during a period of one year=s work. Comparisons of LTC rates between industries, or between years, can be used to indicate increases, decreases, or differences in this risk.

$$\text{LTC Rate} = \frac{\text{Number of LTCs X 100}}{\text{Estimated Person-years}}$$

Duration (Days Lost)

The duration of disability is the number of days following the injury or disease for which the worker was disabled, and unable to perform normal work duties. This information is obtained for this report from data on compensation days paid on each claim from WCB. Alberta Labour obtains these data on March 31 of the year following the claim year, and does not update the information, even though many injured workers continue to be disabled beyond this date. As a result, the duration information reported here underestimates the true impact of lost-time injury and disease.

Duration Rate

The duration rate is calculated by dividing the number of work days lost (disability days) by the person-year estimate, and multiplying by 100. The result is expressed as Adays lost per 100 person-years worked@, and indicates, in part, the economic impact of occupational injury and disease. Duration rates are not recommended as reliable indicators of full economic cost. In addition, readers are warned that duration rates are highly unstable when based on only a few lost-time claims; it is recommended that the duration rate not be calculated based upon fewer than 30 lost-time claims.

$$\text{Duration Rate} = \frac{\text{Disability Days X 100}}{\text{Estimated Person-Years}}$$

WCB Accepted Fatality

An occupational fatality is the death of a worker which result from a work-related incident or exposure and which has been accepted by the WCB for compensation. A fatality is counted in the year it is accepted.

NEC

Means "Not Elsewhere Classified"

UNS

Means "Unspecified"

Appendix B: Upstream Oil and Gas 1999 Industry Codes

Sub-Sector 1: **Exploration**
Industries: 09200~Seismic Geophysical/Mineral Exploration
09201~Shot Hole Drilling

Sub-Sector 2: **Oilfield Maintenance and Construction**
Industries: 06304~Oilfield Construction and/or Maintenance

Sub-Sector 3: **Well Servicing With Service Rigs**
Industries: 09903~Well servicing with Service Rigs including Power Swivels

Sub-Sector 4: **Drilling of Oil and gas Wells**
Industries: 09600~Drilling of Oil & Gas Wells

Sub-Sector 5: **Downhole & Other Oilfield Services**
Industries 06305~Field Production Operators
06306~Vacuum Removal of Waste
09900~Mud Logging
09902~Pressure Cleaning Services
09904~Rathole Drilling and Rig Anchoring
09911~Oilfield Downhole Services
09915~Well Casing Services
09921~Servicing Christmas Trees On Oil Wells
09927~Liquid Waste Treatment & Disposal

Sub-Sector 6: **Tar Sands**
Industries: 06600~Mining & Processing of Bituminous Sand
06601~Research/Development, Oil Sands and Heavy Oil Recovery

Sub-Sector 7: **Oil & Gas Exploration/Development**
Industries: 06300~Oil and Gas Exploration & Development-Upstream Operations

Sub-Sector 8: **Oilfield Trucking Services**
Industries: 50720~Oilfield Trucking Services